CLAIMS

WHAT IS CLAIMED:

1.   A method, comprising:

receiving a first semiconductor wafer for processing;

receiving a second semiconductor wafer for processing; and

performing a cascade processing operation upon said first and said second semiconductor wafers, wherein said cascade processing operation comprises acquiring pre-process metrology data related to said second semiconductor wafer during at least a portion of a time period wherein said first semiconductor wafer is being processed.

2.   The method described in claim 1, further comprising acquiring post-process metrology data relating to said first semiconductor wafer during at least a portion of a time period wherein said second semiconductor wafer is being processed.

3.   The method described in claim 2, further comprising performing a feed-forward process based upon said pre-process metrology.

4.   The method described in claim 3, further comprising performing a subsequent process of a semiconductor wafer based upon said feed-forward process.

5.   The method described in claim 4, wherein performing a feed-forward process based upon said pre-process metrology data further comprises performing a run-to-run feed-forward loop.

6.   The method described in claim 5, wherein performing a run-to-run feed-forward loop further comprises modifying at least one control input parameter for processing a subsequent run of semiconductor wafers.

5   7.   The method described in claim 6, wherein acquiring pre-process metrology data further comprises acquiring pre-process metrology data using an integrated metrology tool.

8.   The method described in claim 6, wherein acquiring post-process metrology data further comprises acquiring post-process metrology data using an integrated metrology tool.

9.   The method described in claim 2, further comprising performing a feedback process based said post-process metrology data, performing said feedback process comprising performing a wafer-to-wafer feedback loop.

10.   The method described in claim 9, wherein performing said wafer-to-wafer feedback loop further comprises modifying at least one control input parameter for a subsequent processing of a semiconductor wafer.

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11.   The method described in claim 1, wherein receiving a first semiconductor wafer for processing further comprises receiving a first set of a plurality of semiconductor wafers.

25   12.   The method described in claim 1, wherein receiving a second semiconductor wafer for processing further comprises receiving a second set of a plurality of semiconductor wafers.

13.   The method described in claim 1, wherein performing a cascade processing operation upon said first and said second semiconductor wafer further comprises:

acquiring pre-process metrology data related to said first semiconductor wafer;

5   processing said first semiconductor wafer after acquiring said pre-process metrology data related to said first semiconductor wafer;

acquiring pre-process metrology related to said second semiconductor wafer during at least a portion of a time period wherein said first semiconductor wafer being processed;

10   acquiring post-process metrology data related to said first semiconductor wafer after said processing of said first semiconductor wafer;

processing said second semiconductor wafer during at least a portion of a time period wherein post-process metrology data related to said first semiconductor wafer is acquired; and

15   acquiring post-process metrology data in response to said processing of said second semiconductor wafer after said processing of said second semiconductor wafer.

14.   A method, comprising:

20   receiving a first semiconductor wafer for processing;

receiving a second semiconductor wafer for processing;

acquiring pre-process metrology data related to said first semiconductor wafer;

processing said first semiconductor wafer after said acquiring of said pre-process metrology data related to said first semiconductor wafer;

25   acquiring pre-process metrology related to said second semiconductor wafer during at least a portion of a time period wherein said first semiconductor wafer being processed;

processing said second semiconductor wafer said acquiring of said pre-process metrology data related to said second semiconductor wafer; and

acquiring post-process metrology data related to said first semiconductor wafer during at least a portion of a time period wherein said second semiconductor

5   wafer is being processed; and

acquiring post-process metrology data related to said second semiconductor wafer after said processing of said second semiconductor wafer.

15.   The method described in claim 14, further comprising performing a feed-

10   forward process based said pre-process metrology data.

16.   The method described in claim 15, further comprising performing a subsequent process of a semiconductor wafer based upon said feed-forward process.

15   17.   The method described in claim 16, wherein performing a feed-forward process based upon said pre-process metrology data further comprises performing a run-to-run feed-forward loop.

18.   The method described in claim 17, wherein performing a run-to-run feed-

20   forward loop further comprises modifying at least one control input parameter for processing a subsequent run of semiconductor wafers.

19.   The method described in claim 18, wherein acquiring pre-process metrology data further comprises acquiring pre-process metrology data using an integrated metrology

25   tool.

20.   The method described in claim 18, wherein acquiring pre-process metrology data further comprises acquiring post-process metrology data using an integrated metrology tool.

5   21.   The method described in claim 14, further comprising performing a feedback process based upon said post-process metrology data, performing said feedback process comprises performing a wafer-to-wafer feedback loop.

22.   The method described in claim 21, wherein performing a wafer-to-wafer feedback loop further comprises modifying at least one control input parameter for a subsequent processing of a semiconductor wafer.

23.   The method described in claim 14, wherein receiving a first semiconductor wafer for processing further comprises receiving a first set of a plurality of semiconductor wafers.

24.   The method described in claim 14, wherein receiving a second semiconductor wafer for processing further comprises receiving a second set of a plurality of semiconductor wafers.

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25.   A system, comprising:

a process controller to perform a cascade process operation, said cascade process operation comprising:

acquiring pre-process data related to a first semiconductor wafer;

25   processing said first semiconductor wafer after said acquiring of said pre-process data relating to said first semiconductor wafer;

acquiring pre-process data related to a second semiconductor wafer during at least a portion of a time period wherein said first semiconductor wafer is being processed;

processing said second semiconductor wafer after said acquiring of said pre-process data related to said second semiconductor wafer;

acquiring post-process data related to said first semiconductor wafer during at least a portion of a time period wherein said second semiconductor wafer is being processed;

acquiring post-process data related to said second semiconductor wafer after said processing of said second semiconductor wafer;

an inline cascade metrology data storage unit operatively coupled to said process controller, said inline cascade metrology data storage unit to receive at least one of an inline pre-process metrology data and an inline post-process metrology data; and

a feedback/feed-forward unit operatively coupled to said process controller and said inline cascade metrology data storage unit, said feedback/feed-forward unit to perform a feedback function in response to at least one of said inline pre-process metrology data and said inline post-process metrology data.

26. The system of claim 25, further comprising:

a computer system operatively coupled with said feedback/feed-forward unit, said computer system to perform at least one of a run-to-run feedback loop and a wafer-to-wafer feedback loop based upon data from said feedback/feed-forward unit;

a manufacturing model operatively coupled with said computer system, said manufacturing model to generate and modify at least one control input parameter signal;

a machine interface operatively coupled with said manufacturing model, said

5   machine interface being capable of receiving process recipes from said manufacturing model;

a processing tool capable of processing semiconductor wafers and operatively coupled with said machine interface, said first processing tool to receive at least one control input parameter signal from said machine interface; and

10   an integrated metrology tool integrated with said processing tool, said integrated metrology tool to acquire at least one of said pre-process metrology data and said post-process metrology data and sending said data to said inline cascade metrology data storage unit.

15   27.   The system of claim 25, wherein said computer system is capable of generating modification data for modifying at least one parameter in said manufacturing model in response to said feedback process.

28.   An apparatus, comprising:

20   means for acquiring pre-process metrology data from said first semiconductor wafer;

means for processing said first semiconductor wafer in response to said acquiring said pre-process metrology data from said first semiconductor wafer;

means for acquiring pre-process metrology from said second semiconductor wafer during at least a portion of a time period wherein said first semiconductor

25   wafer being processed;

means for acquiring post-process metrology data from said first semiconductor wafer in response to said processing of said first semiconductor wafer;

means for processing said second semiconductor wafer in response to said acquiring said pre-process metrology data from said second semiconductor wafer during at least a portion of a time period wherein post-process metrology data related to said first semiconductor wafer is acquired; and

5   means for acquiring post-process metrology data in response to said processing of said second semiconductor wafer.

29.   A computer readable program storage device encoded with instructions that, when executed by a computer, performs a method, comprising:

10   receiving a first semiconductor wafer for processing;

receiving a second semiconductor wafer for processing; and

performing a cascade processing operation upon said first and said second semiconductor wafers, wherein said cascade processing operation comprises acquiring pre-process metrology data related to said second semiconductor

15   wafer during at least a portion of a time period wherein said first semiconductor wafer being processed.

30.   The computer readable program storage device encoded with instructions that, when executed by a computer, performs the method described in claim 29, the method

20   further comprising acquiring post-process metrology data relating to said first semiconductor wafer during at least a portion of a time period wherein said second semiconductor wafer being processed.

31.   The computer readable program storage device encoded with instructions that, when executed by a computer, performs the method described in claim 29, the method

25   further comprising performing a feed-forward process based upon said pre-process metrology.

32.   The computer readable program storage device encoded with instructions that, when executed by a computer, performs the method described in claim 31, the method further comprising performing a subsequent process of a semiconductor wafer based upon said feed-forward process.

33.   The computer readable program storage device encoded with instructions that, when executed by a computer, performs the computer readable program storage device encoded with instructions that, when executed by a computer, performs the method described in claim 32, wherein performing a feed-forward process based upon said pre-process metrology data further comprises performing a run-to-run feed-forward loop.

34.   The computer readable program storage device encoded with instructions that, when executed by a computer, performs the method described in claim 33, wherein performing a run-to-run feed-forward loop further comprises modifying at least one control input parameter for processing a subsequent run of semiconductor wafers.

35.   The computer readable program storage device encoded with instructions that, when executed by a computer, performs the method described in claim 34, wherein acquiring pre-process metrology data further comprises acquiring pre-process metrology data using an integrated metrology tool.

36.   The computer readable program storage device encoded with instructions that, when executed by a computer, performs the method described in claim 34, wherein acquiring post-process metrology data further comprises acquiring post-process metrology data using an integrated metrology tool.

37.   The computer readable program storage device encoded with instructions that, when executed by a computer, performs the method described in claim 32, the method further comprising performing a feedback process based said post-process metrology data, performing said feedback process comprising performing a wafer-to-wafer feedback loop.

38.   The computer readable program storage device encoded with instructions that, when executed by a computer, performs the method described in claim 37, wherein performing said wafer-to-wafer feedback loop further comprises modifying at least one control input parameter for a subsequent processing of a semiconductor wafer.

39.   The computer readable program storage device encoded with instructions that, when executed by a computer, performs the method described in claim 29, wherein receiving a first semiconductor wafer for processing further comprises receiving a first set of a plurality of semiconductor wafers.

40.   The computer readable program storage device encoded with instructions that, when executed by a computer, performs the method described in claim 29, wherein receiving a second semiconductor wafer for processing further comprises receiving a second set of a plurality of semiconductor wafers.

41.   The computer readable program storage device encoded with instructions that, when executed by a computer, performs the method described in claim 29, wherein performing a cascade processing operation upon said first and said second semiconductor wafer further comprises:

acquiring pre-process metrology data from said first semiconductor wafer;

processing said first semiconductor wafer in response to said acquiring said pre-process metrology data from said first semiconductor wafer;

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acquiring pre-process metrology from said second semiconductor wafer during at

least a portion of a time period wherein said first semiconductor wafer being

processed;

acquiring post-process metrology data from said first semiconductor wafer in

5   response to said processing of said first semiconductor wafer;

processing said second semiconductor wafer in response to said acquiring said pre-

process metrology data from said second semiconductor wafer during at least

a portion of a time period wherein post-process metrology data related to said

first semiconductor wafer is acquired; and

10   acquiring post-process metrology data in response to said processing of said second

semiconductor wafer.